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| **Unifying Concept** | **Grade 8** |
| Matter: Properties and Change | 14-16% |
| Energy Conservation and Transfer | 10-12% |
| Earth Systems, Structures, and Processes | 13-15% |
| Earth History | 11-13% |
| Structure and Function of Living Organisms | 19-23% |
| Ecosystems | 9-11% |
| Evolution and Genetics | 11-13% |
| Molecular Biology | 8-10% |

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|  | **Subject: Science**  **Grade Level: 8th**  **Unit Title: HYDROSPHERE** | | **Time frame Needed for Completion:**  **5 weeks** | | |
| **UNIT 1** | **Enduring Understanding:** **All matter is composed of atoms that interact with each other in different ways to form everything we see on earth.**  ***Domain(s): EARTH SYSTEMS, STRUCTURES and PROCESSES***  ***Priority Standard(s):***  ***8.E.1 Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans.***  ***8.E.1.1*** *Explain the structure of the hydrosphere including:*   * *Water distribution on earth* * *Local river basin and water availability*   ***8.E.1.2*** *Summarize evidence the Earth’s oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms:*   * *Estuaries* * *Marine ecosystems* * *Upwelling* * *Behavior of gases in the marine environment* * *Value and sustainability* * *Deep ocean technology and understandings gained*   ***8.E.1.3*** *Predict the safety and potability of water supplies in North Carolina based on physical and biological factors, including:*   * *Temperature* * *Dissolved oxygen* * *pH* * *Nitrates and Phosphates* * *Turbidity* * *Bio-indicators*   ***8.E.1.4*** *Conclude that the good health of humans requires:*   * *Monitoring the hydrosphere* * *Water quality standards* * *Methods of water treatment* * *Maintaining safe water quality* * *Stewardship*   ***Supporting Standard(s):***  ***6.E.1 Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe.***  ***6.E.1.1*** *Explain why Earth sustains life while other planets do not based on their properties (including types of surface, atmosphere and gravitational force) and location to the Sun.*  ***6.E.2 Understand the structure of the earth and how interactions of constructive and destructive forces have resulted in changes in the surface of the Earth over time and the effects of the lithosphere on humans.***  ***6.E.2.3*** *Explain how crustal plates and ocean basins are formed, move and interact using earthquakes, heat flow and volcanoes to reflect forces within the earth.*  ***6.E.2.4*** *Conclude that the good health of humans requires monitoring the lithosphere, maintaining soil quality and stewardship.*  ***7.E.1 Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth’s atmosphere, weather and climate and the effects of the atmosphere on humans.***  ***7.E.1.6*** *Conclude that the good health of humans requires: monitoring the atmosphere, maintaining air quality and stewardship.* | | | | |
| **Science Process Skills:**   1. Use the senses to gather information about an object or event. 2. Make an “educated guess” about an object or event based on previously gathered data or information. 3. Use both standard and nonstandard measures or estimates to describe the dimensions of an object or event. 4. Use words or graphic symbols to describe an object or event. 5. Group or order objects or events into categories based on properties or criteria. 6. State the outcome of a future event based on a pattern of evidence. 7. Conduct an experiment, including asking an appropriate question, stating a hypothesis, identifying and controlling variables, operationally defining variables, designing a “fair” experiment, conducting the experiment and interpreting the results of the experiment. 8. Create a mental or physical model of a process or event. | | | | |
| **Essential Question(s):**   * **Why do we need regulations for water quality?** * **How does water cycle through the hydrosphere?** * **How do the ocean resources sustain human life?** * **How do we determine the health of a water system?** * **What role do I play in maintaining the quality of the hydrosphere?** | | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | | |
| * Hydrosphere * Solvent * Solute * Aquifer * Watershed * Saturate * Impermeable * Resource * Ocean basin * Water cycle * Salinity * Photosynthesis * Upwelling * Terrestrial * stewardship | * Aquatic * Dissolved oxygen * Dissolved carbon dioxide * Pollutant * Hydrothermal vent * Chemosynthesis * Intertidal zone * Neritic zone * Benthic zone * Plankton * Nekton * pH * estuary * point source pollutant * non-point source pollutant | * Analyze (Analysis) * Write * Fluent/Fluency * Distinguish comparisons * Flexible * Hypothesize (Hypothesis) * Predict (Prediction) * System * Theory * Law * Constant * Variable (independent and dependent) * Control | * Interpret * Model * Represent * Describe * Effect * Explain * Balance * Constant * Relationship |
| **Concepts:**  **What Students Need to Know**:   * + The water cycle is a continuous process that circulates water on Earth.   + As a solvent, water is able to dissolve minerals and gases and carry them to the oceans.   + Most of the Earth’s water is found in the oceans; most of the freshwater is located in ice caps, glaciers and aquifers.   + Though the salinity of the open sea is fairly constant, the properties of the zones of the ocean vary in temperature, pressure, and light penetration.   + Productivity is greatest in the surface layers where photosynthesis occurs   + Upwelling is a process that cycles nutrients in the ocean water.   + Terrestrial and aquatic food webs are interconnected and affected by the nutrient level in the oceans.   + Estuaries provide a habitat for many marine species, buffer zones for pollutants and breeding grounds for organisms; they act as a filtering system and provide nursery areas for aquatic species.   + The three different marine zones are shore, open ocean and deep ocean; deep ocean ecosystems are independent of energy from sunlight and photosynthetic organisms (hydrothermal vents, submarine hot springs, methane cold seeps).   + Deep ocean technology and exploration continues to provide new information about the ocean.   + Oceans provide many resources necessary for human life in addition to food.   + Microorganisms are the most abundant form of life in the ocean and the most important primary consumers.   + The health of a water system is determined by physical, chemical and biological variables; these variables are constantly changing due to man-made and natural forces.   + Population diversity provides insight into the health of a water system.   + Water must be tested for specific contaminants.   + Bio-indicators serve as an indicator of the quality of a water system.   + The USA has implemented standards for our nation’s drinking water.   + Water treatment plants have been adapted to clean water used in USA.   + We are all connected to North Carolina’s hydrological system. | | **Skills:**  **What Students Need To Be Able To Do:**   * + Describe each step in the water cycle.   + Use a food web to explain the interconnectedness of aquatic and terrestrial ecosystems.   + Use water monitoring techniques to predict the health of a water system.   + Design an experiment to determine the quality of the water in their area.   + Differentiate between point and non-point pollutants in a given ecosystem.   + Explain the progression of laws to monitor water quality in the USA.   + Advise others on the importance of good stewardship concerning water quality and the role we each play in maintaining our water systems. | | |
| **Instructional Strategies/Formative Assessment:**   * Discuss the Essential Question as it fits within the context of the lesson during the week. * Encourage students to use “I CAN” statements * Develop learning targets that are student friendly * Discuss learning targets with students * Develop foundational understand of vocabulary * Collect evidence to show mastery * Adjust instruction as needed based on collected evidence * Use hands on experiments to supplement knowledge * Use the 5 E’s : * Engage * Explore * Explain * Elaborate * Evaluate | | | | |
| **Recommended Assessments:**  Daily Formative Assessments  Collaborative Assessments  Common Formative Assessments  Weekly Teacher Made Assessments  Daily “DO NOW”  Student Products  NCDPI Indicators  Foldables  DPI Resources  Computer Programs  Scientific Experiments | | | | |
| **Recommended Resources:**  **DPI website:** [**www.ncpublicschools.org**](http://www.ncpublicschools.org)  AVID: Write Path-Science  Shell Education “Standards Based Science Investigations”  NCDPI Indicators  Brain POP  Instructional Resources  ClassScape  NC Essential Standards Unpacking the Standards-SCIENCE  <http://www.thinkfinity.org>  <http://www.curriki.org>  <http://www.readwritethink.org/index.asp>  <http://streaming.discoveryeducation.com/>  <http://digitalgallery.nypl.org/nypldigital/index.cfm>  <http://betterlesson.org/>  <http://www.smithsonianchannel.com/site/sn/home.do>  <http://www.nysedregents.org/grade8/science/home.html>  <http://www.corestandards.org/the-standards/english-language-arts-standards/science-technical/grades-6-8/> | | | | |

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|  | **Subject: Science**  **Grade Level: 8th**  **Unit Title: EVOLUTION** | | **Time frame Needed for Completion:**  **4 weeks** | | |
| **UNIT 2** | **Enduring Understanding:** **The evolution of organisms and landforms can be seen in evidence of change recorded in fossil records and landforms.**  ***Domain(s): EVOLUTION and GENETICS***  ***Priority Standard(s):***  ***8.L.4 Understand the evolution of organisms and landforms based on evidence, theories and processes that impact the Earth over time.***  ***8.L.4.1*** *Summarize the use of evidence drawn from geology, fossils and comparative anatomy to form the basis for biological classification systems and the theory of evolution.*  ***8.L.4.2*** *Explain the relationship between genetic variation and an organism’s ability to adapt to its environment.*  ***8.E.2 Understand the history of Earth and its life forms based on evidence of change recorded in fossil records and landforms.***  ***8.E.2.1*** *Infer the age of Earth and relative age of rocks and fossils from index fossils and ordering of rock layers (relative dating and radioactive dating).*  ***8.E.2.2*** *Explain the use of fossils, ice cores, composition of sedimentary rocks. faults, and igneous rock formations found in rock layers as evidence of the history of the Earth and its changing life forms.*  ***8.L.2 Understanding how biotechnology is used to affect living organisms****.*  ***8.L.2.1*** *Summarize aspects of biotechnology including:*   * *Specific genetic information available* * *Careers* * *Economic benefits to North Carolina* * *Ethical issues* * *Implications for agriculture*   ***Supporting Standard(s):***  ***8.L.3 Understand how organisms interact with and respond to the biotic and abiotic components of their environment.***  ***8.L.3.2*** *Summarize the relationships among producers, consumers and decomposers including the positive and negative consequences of such interactions including:*   * *Coexistence and cooperation* * *Competition (predator/prey)* * *Parasitism* * *mutualism*   ***7.L.1 Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life.***  ***7.L.1.2*** *Compare the structures and functions of plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, chloroplasts, mitochondria and vacuoles).*  ***7.L.1.4*** *Summarize the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation and excretion) and the ways that these systems interact with each other to sustain life.*  ***7.L.2 Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance and external factors to potential variation among offspring.***  ***7.L.2.1*** *Explain why offspring that result from sexual reproduction (fertilization and meiosis) have greater variation than offspring that result from asexual reproduction (budding and meiosis).* | | | | |
| **Science Process Skills:**   1. Use the senses to gather information about an object or event. 2. Make an “educated guess” about an object or event based on previously gathered data or information. 3. Use both standard and nonstandard measures or estimates to describe the dimensions of an object or event. 4. Use words or graphic symbols to describe an object or event. 5. Group or order objects or events into categories based on properties or criteria. 6. State the outcome of a future event based on a pattern of evidence. 7. Conduct an experiment, including asking an appropriate question, stating a hypothesis, identifying and controlling variables, operationally defining variables, designing a “fair” experiment, conducting the experiment and interpreting the results of the experiment. 8. Create a mental or physical model of a process or event. | | | | |
| **Essential Question(s):**   * **Why is change essential for survival?** * **How do living things adapt to their environment?** | | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | | |
| * Evolution * Extinction * Geologic time scale * Fossil * Rock layer * Ice core * Law of superposition * Plate-tectonics * Adaptation * Homologous structure * Analogous structure * Embryo | * phenotype * genotype * absolute age * relative age * natural selection * mutation * sexual reproduction * chromosome * Classification * Taxonomy * Genetic diversity * variation | * Analyze (Analysis) * Write * Fluent/Fluency * Distinguish comparisons * Flexible * Hypothesize (Hypothesis) * Predict (Prediction) * System * Theory * Law * Constant | * Interpret * Model * Represent * Describe * Effect * Explain * Balance * Constant * Relationship * Variable (independent and dependent) * Control |
| **Concepts:**  **What Students Need to Know**:   * + Changes in environmental conditions affect the survival of individual organisms and entire species; the primary cause of extinctions has been environmental change.   + The history of change of the life on Earth as well as the shape of the Earth’s surface is called evolution and is illustrated using the geologic time scale.   + The evidence that organisms and landforms change over time is scientifically described using the Theory of Evolution, the Plate Tectonics Theory and the Law of Superposition.   + Living things evolve in response to changes in their environment.   + Organisms that were best adapted to deal with climatic, geographic and environmental changes throughout time have survived while other organisms have become extinct.   + The evolution of Earth’s living things is strongly linked to the movements of the lithospheric plates.   + Biological evolution accounts for the diversity of species; species acquire many of their unique characteristics through biological adaptation.   + Individual organisms with certain traits are more likely than others to survive and have offspring.   + Genetic variation among offspring contributes to phenotypic variation.   + Living things have morphological, biochemical and behavioral features that make them well adapted for their environment. | | **Skills:**  **What Students Need To Be Able To Do:**   * + Describe the relatedness of modern organisms and historic organisms using an evolutionary tree and homologous or analogous structures.   + Design an organism for a particular environment based on the conditions of the environment   + Use the geologic time scale to explain the extinction or emergence of species in Earth’s history.   + Use evolutionary theories to discuss the common features of different species.   + Describe the evolution of Earth’s landmasses using the Plate Tectonics Theory.   + Predict the relative age of a fossil or rock layer using the Law of Superposition. | | |
| **Instructional Strategies/Formative Assessment:**   * Discuss the Essential Question as it fits within the context of the lesson during the week. * Encourage students to use “I CAN” statements * Develop learning targets that are student friendly * Discuss learning targets with students * Develop foundational understand of vocabulary * Collect evidence to show mastery * Adjust instruction as needed based on collected evidence * Use hands on experiments to supplement knowledge * Use the 5 E’s : * Engage * Explore * Explain * Elaborate * Evaluate | | | | |
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|  | **Subject: Science**  **Grade Level: 8th**  **Unit Title: MICROBIOLOGY and DISEASE** | | **Time frame Needed for Completion:**  **10 weeks** | | |
| **UNIT 3** | **Enduring Understanding:** **When a balance is not maintained within an organism, disease can set in and upset the internal environment. Though advances in biotechnology provide benefits, there are certain ethical implications.**  ***Domain(s): MOLECULAR BIOLOGY***  ***Priority Standard(s):***  ***8.L.1 Understand the structure and hazards caused by agents of disease that affect living organisms.***  ***8.L.1.1*** *Summarize the basic characteristics of viruses, bacteria, fungi and parasites relating to the spread, treatment and prevention of disease.*  ***8.L.1.2*** *Explain the difference between epidemic and pandemic as it relates to the spread, treatment and prevention of disease.*  ***8.L.5 Understand the composition of various substances as it relates to their ability to serve as a source of energy and building materials for growth and repair of organisms.***  ***8.L.5.1*** *Summarize the basic characteristics of viruses, bacteria, fungi and parasites relating to the spread, treatment and prevention of disease.*  ***8.L.5.2*** *Explain the difference between epidemic and pandemic as it relates to the spread, treatment and prevention of disease.*  ***Supporting Standard(s):***  ***7.L.2 Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance and external factors to potential variation among offspring.***  *7.L.2.5 Explain the impact of the environmental and lifestyle choices on biological inheritance.*  ***8.E.1 Understand the hydrosphere and the impact of humans on the effects of the hydrosphere on humans.***  ***8.E.1.4*** *Conclude that the good health of humans requires:*   * *Monitoring the hydrosphere* * *Water quality standards* * *Methods of water treatment* * *Maintaining safe water quality* * *Stewardship* | | | | |
| **Science Process Skills:**   1. Use the senses to gather information about an object or event. 2. Make an “educated guess” about an object or event based on previously gathered data or information. 3. Use both standard and nonstandard measures or estimates to describe the dimensions of an object or event. 4. Use words or graphic symbols to describe an object or event. 5. Group or order objects or events into categories based on properties or criteria. 6. State the outcome of a future event based on a pattern of evidence. 7. Conduct an experiment, including asking an appropriate question, stating a hypothesis, identifying and controlling variables, operationally defining variables, designing a “fair” experiment, conducting the experiment and interpreting the results of the experiment. 8. Create a mental or physical model of a process or event. | | | | |
| **Essential Question(s):**   * **What is the relationship between the microscopic and macroscopic environment?** | | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | | |
| * Cell * Organelle * Mitosis * Meiosis * Multi-cellular * Unicellular * Prokaryote * Eukaryote * Carcinogen * Virus * Bacteria * Protozoa * Parasite * Fungi * Algae * Mutagen * Contagion | * Pandemic * Epidemic * Antibiotic * Vaccine * Preservative * Euglena * Paramecium * Volvox * Amoeba * Pseudopod * Eyespot * Cilia * Flagella * Pathogen * Carrier * Vector | * Analyze (Analysis) * Write * Fluent/Fluency * Distinguish comparisons * Flexible * Hypothesize (Hypothesis) * Predict (Prediction) * System * Theory * Law * Constant * Variable (independent and dependent) * Control | * Interpret * Model * Represent * Describe * Effect * Explain * Balance * Constant * Relationship |
| **Concepts:**  **What Students Need to Know**:   * + Microscopic organisms (viruses, bacteria, protozoa, parasites and some fungi and algae) lack tissue differentiation, are unicellular and exhibit diversity of form and size.   + Viruses, bacteria, fungi and parasites may infect the human body and interfere with normal body functions.   + Viruses are not considered alive, but they can infect living things; they need a host cell to survive and reproduce.   + Bacteria are very small organisms that are found everywhere; they are classified according to shape.   + We use antibiotics to help with bacterial infections and vaccines to help with taking care of viruses that cause infections.   + Vectors are mechanisms that spread disease without getting sick itself.   + An infectious disease can be passed from one organism to another.   + Scientists study microbial pathogens to find methods for prevention and treatment of disease.   + Technology can be used to reduce the risk of and the treatment of these infections.   + An epidemic is an outbreak of a disease that affects a disproportionately large number of individuals; a pandemic is an epidemic that spreads across continents.   + All organisms are composed of cells; most organisms are single celled and others are multicellular   + Cells carry out the functions needed to sustain life   + Cells grow and divide producing more cells; this division requires energy   + Cells lacking membrane bound organelles are called prokaryotes (bacteria); cells containing membrane bound organelles are called eukaryotes.   + Each organelle has a specific function for cell survival.   + Lifestyle choices, environmental factors and genetics can cause abnormalities to occur during embryonic development as well as later in life   + Human activities such as smoking, alcohol consumption and drug use lead to adverse conditions within the human body   + Technology and medical advances help us understand how the human body functions and allows us to make informed decisions regarding our health. | | **Skills:**  **What Students Need To Be Able To Do:**   * + Develop an analogous relationship between the structures of the cell and the structures of another working system   + Describe the transfer of disease between organisms (infectious vs genetic disease)   + Differentiate between treatment and prevention of bacterial and viral infections   + Explain the risks associated with the use of toxic substances   + Explain the abnormal cell division associated with cancer and identify cancer causing agents (carcinogens) | | |
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|  | **Subject: SCIENCE**  **Grade Level: 8th**  **Unit Title: Ecosystems** | | **Time frame Needed for Completion:**  **4 weeks** | | |
| **UNIT 4** | **Enduring Understanding:** **The survival of an organism is dependent on the flow of energy in the ecosystem.**  ***Domain(s): ECOSYSTEMS***  ***Priority Standard(s):***  ***8.L.3 Understand how organisms interact with and respond to the biotic and abiotic components of their environment.***  ***8.L.3.1*** *Explain how factors such as food, water, shelter and space affect populations in an ecosystem.*  ***8.L.3.2*** *Summarize the relationships among producers, consumers and decomposers including the positive and negative consequences of such interactions including:*   * *Coexistence and cooperation* * *Competition (predator/prey)* * *Parasitism* * *mutualism*   ***8.L.3.3*** *Explain how the flow of energy within food webs is interconnected with the cycling of matter (including water, nitrogen, carbon dioxide and oxygen)*  ***Supporting Standard(s):***  ***6.L.1 Understand the structures, processes and behaviors of plants that enable them to survive and reproduce.***  ***6.L.1.2*** *Explain the significance of the processes of photosynthesis, respiration, and transpiration to the survival of green plants and other organisms.*  ***6.L.2 Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment.***  ***6.L.2.1*** *Summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within food chains and food webs (terrestrial and aquatic) from producers to consumers to decomposers.* | | | | |
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| **Essential Question(s):**   * **How are organisms interconnected in their environment?** * **What role do abiotic factors play in an ecosystem?** * **How do nutrients cycle between organisms in an ecosystem?** | | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | | |
| * Autotroph * Heterotroph * Habitat * Niche * Ecosystem * Environment * Species * Biotic * Abiotic * Population * Community * Resource * Photosynthesis * Respiration | * Producer * Consumer * Aquatic ecosystem * Terrestrial ecosystem * Decomposer * Symbiosis * Commensalism * Mutualism * Parasitism * Predator * Prey * Transpiration * Herbivore * Carnivore * Omnivore | * Analyze (Analysis) * Write * Fluent/Fluency * Distinguish comparisons * Flexible * Hypothesize (Hypothesis) * Predict (Prediction) * System * Theory * Law * Constant * Variable (independent and dependent) * Control | * Interpret * Model * Represent * Describe * Effect * Explain * Balance * Constant * Relationship |
| **Concepts:**  **What Students Need to Know**:   * + Energy can change from one form to another in living things.   + Almost all food energy comes originally from sunlight.   + Organisms with similar needs may compete with one another for limited resources.   + A habitat is a place where an organism lives; an organism’s habitat must satisfy its needs for food, shelter, space, water, air, etc.   + Each species occupies its own niche in its environment; a species’ niche includes all of its interactions with the biotic and abiotic factors in its habitat.   + Organisms can be categorized according to how they obtain food (producers, consumers and decomposers).   + The energy within an ecosystem is cycled between organisms that eat the plants and the organisms that eat those organisms; the cycle continues indefinitely as decomposers break down dead organisms and return food materials back to the environment.   + Populations of various species co-exist and cooperate within an ecosystem; relationships can be competitive or symbiotic.   + As energy moves from one trophic level to the next, energy is lost to the environment; this is shown in an energy period.   + Matter, in the forms of nutrients, also moves through organisms at each level; the atoms of carbon, nitrogen, oxygen and other elements make up the bodies of organisms alive today are the same atoms that have been on Earth since life began.   + All life on Earth is based on carbon molecules; autotrophs use energy from the sun to convert carbon dioxide gas into energy-rich carbon molecules which autotrophs use for growth and energy, which is in turn released and returned to the atmosphere.   + Though nitrogen makes up 78% of the air, plants must use nitrogen in the atmosphere that has been converted into more usable forms. | | **Skills:**  **What Students Need To Be Able To Do:**   * + Describe the cycling of carbon, nitrogen and oxygen between organisms in an ecosystem.   + Explain the relationship between organisms in an environment.   + Identify producers, consumers and decomposers in a food web.   + Describe how the processes of photosynthesis and respiration cycle nitrogen, carbon dioxide and oxygen between autotrophs and heterotrophs in an ecosystem.   + Explain the difference in energy level from one trophic level to the next. | | |
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|  | **Subject: Science**  **Grade Level: 8th**  **Unit Title: MATTER** | | **Time frame Needed for Completion:**  **6 weeks** | | |
| **UNIT 5** | **Enduring Understanding:** **All matter is composed of atoms that interact with each other in different ways to form everything we see on earth.**  ***Domain(s): MATTER: PROPERTIES and CHANGE***  ***Priority Standard(s):***  ***8.P.1 Understand the properties of matter and changes that occur when matter interacts in an open and closed container.***  ***8.P.1.1*** *Classify matter as elements, compounds, or mixtures based on how the atoms are packed together in arrangements.*  ***8.P.1.2*** *Explain how the physical properties of elements and their reactivity have been used to produce the current model of the Periodic Table of Elements.*  ***8.P.1.3*** *Compare physical changes such as size, shape and state to chemical changes that are a result of a chemical reaction to include changes in temperature, color, formation of a gas or precipitate.*  ***8.P.1.4*** *Explain how the idea of atoms and a balanced chemical equation support the law of conservation of mass.*  ***Supporting Standard(s):***  ***5.P.2 Understand the interactions of matter and energy and the changes that occur.***  ***5.P.2.1*** *Compare the weight of an object to the sum of the weight of its parts before and after an interaction.*  ***5.P.2.2*** *Summarize properties of original materials and the new material(s) formed, to demonstrate that a change has occurred.*  ***6.P.2 Understand the structure, classifications and physical properties of matter.***  ***6.P.2.1*** *Recognize that all matter is made up of atoms and atoms of the same elements are all alike, but are different from the atoms of other elements.*  ***6.P.2.2*** *Explain the effect of heat on the motion of atoms through a description of what happens to particles during a change in phase.*  ***6.P.2.3*** *Compare the physical properties of pure substances that are independent of the amount of matter present including density, melting point, boiling point, and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight.* | | | | |
| **Science Process Skills:**   1. Use the senses to gather information about an object or event. 2. Make an “educated guess” about an object or event based on previously gathered data or information. 3. Use both standard and nonstandard measures or estimates to describe the dimensions of an object or event. 4. Use words or graphic symbols to describe an object or event. 5. Group or order objects or events into categories based on properties or criteria. 6. State the outcome of a future event based on a pattern of evidence. 7. Conduct an experiment, including asking an appropriate question, stating a hypothesis, identifying and controlling variables, operationally defining variables, designing a “fair” experiment, conducting the experiment and interpreting the results of the experiment. 8. Create a mental or physical model of a process or event. | | | | |
| **Essential Question(s):**   * How does the activity of matter on the atomic level affect what we see? * What is the difference between a chemical change and a physical change? * How can the Periodic Table be used to predict the reactivity of an element? | | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | | |
| * Matter * Atom * Element * Compound * Mixture * Homogeneous mixture * Heterogeneous mixture * Molecule * Filtration * Evaporation * Polarity * Precipitate * Law of conservation of mass * Solute * Solution | * Reactivity * Metal * Nonmetal * Conductor * Insulator * Metalloid * Chemical property * Physical property * Melting point * Boiling point * Solubility * Density * Product * Reactant * Solvent * Period * Group | * Analyze (Analysis) * Write * Fluent/Fluency * Distinguish comparisons * Flexible * Hypothesize (Hypothesis) * Predict (Prediction) * System * Theory * Law * Constant * Variable (independent and dependent) * Control * Constant * Relationship | * Interpret * Model * Represent * Describe * Effect * Explain * Balance |
| **Concepts:**  **What Students Need to Know**:   * + Atoms join together in different arrangements to compose all substances   + The arrangements determine the characteristics of substances   + Elements are pure substances that are composed of only one kind of atom; they cannot be changed into simpler substances.   + Compounds are pure substances that are composed of two or more types of elements that have been chemically combined; they can only be separated by chemical means.   + Mixtures are composed of two or more different substances that are combined by physical means; each substance retains its own individual properties.   + The Periodic Table is arranged according to patterns evident in the elements and their relationship to one another. | | **Skills:**  **What Students Need To Be Able To Do:**   * + Identify substances as compound or element using chemical formula.   + Classify as physical or chemical change based on evidence in reaction   + Balance equations according to the law of conservation   + Classify as metal or nonmetal according to position on Periodic Table   + Predict reactivity of an element based on their location on the periodic table. | | |
| **Instructional Strategies/Formative Assessment:**   * Discuss the Essential Question as it fits within the context of the lesson during the week. * Encourage students to use “I CAN” statements * Develop learning targets that are student friendly * Discuss learning targets with students * Develop foundational understand of vocabulary * Collect evidence to show mastery * Adjust instruction as needed based on collected evidence * Use hands on experiments to supplement knowledge * Use the 5 E’s : * Engage * Explore * Explain * Elaborate * Evaluate | | | | |
| **Recommended Assessments:**  Daily Formative Assessments  Collaborative Assessments  Common Formative Assessments  Weekly Teacher Made Assessments  Daily “DO NOW”  Student Products  NCDPI Indicators  Foldables  DPI Resources  Computer Programs  Scientific Experiments | | | | |
| **Recommended Resources:**  **DPI website:** [**www.ncpublicschools.org**](http://www.ncpublicschools.org)  AVID: Write Path-Science  Shell Education “Standards Based Science Investigations”  NCDPI Indicators  Brain POP  Instructional Resources  ClassScape  NC Essential Standards Unpacking the Standards-SCIENCE  <http://www.thinkfinity.org>  <http://www.curriki.org>  <http://www.readwritethink.org/index.asp>  <http://streaming.discoveryeducation.com/>  <http://digitalgallery.nypl.org/nypldigital/index.cfm>  <http://betterlesson.org/>  <http://www.smithsonianchannel.com/site/sn/home.do>  <http://www.nysedregents.org/grade8/science/home.html>  <http://www.corestandards.org/the-standards/english-language-arts-standards/science-technical/grades-6-8/> | | | | |

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|  | **Subject: Science**  **Grade Level: 8th**  **Unit Title: ENERGY** | | **Time frame Needed for Completion:**  **4 weeks** | | |
| **UNIT 6** | **Enduring Understanding:** **Conservation of our natural resources is essential to ensure the sustainability of our natural resources.**  ***Domain(s): ENERGY: CONSERVATION and TRANSFER***  ***Priority Standard(s):***  ***8.P.2 Explain the environmental implications associated with the various methods of obtaining, managing and using energy resources.***  ***8.P.2.1*** *Explain the environmental consequences of the various methods of obtaining, transforming, and distributing energy.*  ***8.P.2.2*** *Explain the implications of the depletion of renewable and nonrenewable energy resources and the importance of conservation.*  ***Supporting Standard(s):***  ***6.P.3 Understand the characteristics of energy transfer and interactions of matter and energy.***  ***6.P.3.1*** *Illustrate the transfer of heat energy from warmer objects to cooler ones using examples of conduction, radiation and convection and the effects that may result.*  ***6.P.3.3*** *Explain the suitability of materials for use in technological design based on a response to heat (to include conduction, expansion, and contraction) and electrical energy (conductors and insulators).*  ***7.P.2 Understand forms of energy, energy transfer and transformation and conservation in mechanical systems.***  ***7.P.2.2*** *Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).* | | | | |
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| **Essential Question(s):**   * **Why is conservation necessary for human survival?** * **What are the effects of human behavior on the environment?** | | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | | |
| * Environment * Transformation * Photovoltaic cell * Solar energy * Fossil fuels * Geothermal energy * Nuclear energy * Hydroelectric energy | * Reduce * Reuse * Recycle * Energy consumption * Renewable resources * Nonrenewable resources * Sustainability * Wind energy * Conservation | * Analyze (Analysis) * Write * Fluent/Fluency * Distinguish comparisons * Flexible * Hypothesize (Hypothesis) * Predict (Prediction) * System * Theory * Law * Constant | * Interpret * Model * Represent * Describe * Effect * Explain * Balance * Constant * Relationship * Variable (independent and dependent) * Control |
| **Concepts:**  **What Students Need to Know**:   * + The environmental consequences of different ways of obtaining, transforming and distributing energy   + The advantages and disadvantages of using alternative forms of energy (solar, wind, etc.)   + The environmental implications of humans increased need for energy.   + The difference between nonrenewable and renewable energy sources | | **Skills:**  **What Students Need To Be Able To Do:**   * Use evidence to support choosing a “best” energy source * Explain the apparent “loss” of energy in transfer from one object to another * Identify an energy source as renewable or non-renewable | | |
| **Instructional Strategies/Formative Assessment:**   * Discuss the Essential Question as it fits within the context of the lesson during the week. * Encourage students to use “I CAN” statements * Develop learning targets that are student friendly * Discuss learning targets with students * Develop foundational understand of vocabulary * Collect evidence to show mastery * Adjust instruction as needed based on collected evidence * Use hands on experiments to supplement knowledge * Use the 5 E’s : * Engage * Explore * Explain * Elaborate * Evaluate | | | | |
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